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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,041	07/10/2007	Yoshitsugu Morita	DC10032PCT (71,051-071)	3380
27305 7590 08/11/2011 HOWARD & HOWARD ATTORNEYS PLLC 450 West Fourth Street Royal Oak, MI 48067			EXAMINER HUDA, SAEED M	
			ART UNIT 1742	PAPER NUMBER
			MAIL DATE 08/11/2011	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/599,041	<b>Applicant(s)</b> MORITA ET AL.	
	<b>Examiner</b> SAEED HUDA	<b>Art Unit</b> 1742	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2011.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The response filed on 06/16/2011 has been fully considered and entered into the record. Claims 1-10 are pending in the application. Claim 10 is withdrawn.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyajima et al. (US 2002/0015748 A1) in view of Lee et al. (EP-A-0 99798).

a. Regarding claim 1, Miyajima et al. teach a method of manufacturing a semiconductor device sealed in a cured resin body by placing an unsealed semiconductor device into a mold and subjecting a curable resin composition that fills the spaces between the mold and the unsealed semiconductor device to compression molding under a predetermined molding temperature ([0001] and figure 1). Miyajima et al. fail to teach the use of a liquid silicon composition, wherein the viscosity at room temperature is of 90 Pa·s or less or the claimed time interval.

Lee et al. teach a compression set of a hydrosilylation-curable liquid silicone composition used in cured injection moldable compositions (abstract).

Lee et al. go on to teach that the silicon composition has a viscosity of less than

90 Pa·s at room temperature (paragraph 66 and examples 1-2) and is suitable for the encapsulation of chip scale packages (paragraph 19).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the invention of Miyajima et al. by selecting the invention of Lee et al. because this will yield desirable properties such as low alpha particle emissions, very good moisture resistance, excellent electrical insulation, excellent thermal stability, and very high ionic purity ([0002]).

Applicant states that the curable silicone composition may be comprised at least of the following components:

- an organopolysiloxane having at least two alkenyl groups per molecule;
- an organopolysiloxane having at least two silicon-bonded hydrogen atoms per molecule;
- a platinum-type catalyst;
- a filler ([0068]).

Applicant also teach that the curing temperature of the silicone is from 50 °C – 150 °C ([0067])

Lee et al. teach the silicone composition can be made of:

- polydiorganosiloxane containing an average of at least two silicon-bonded alkenyl groups per molecule (page 4, lines 9-10) (similar to that of Applicant's invention) ([0022])

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- an organohydrogen polysiloxane having average of at least three silicon-bonded hydrogen atoms per molecule and an average of not more than one silicone-bonded hydrogen atom per molecule ([0041])
- a platinum group metal compound that promotes the addition reaction of the above components([0057])
- an inorganic filler ([0063])

Lee et al. teach that the curing temperature of the silicone is from 100°C – 150°C ([0070])

Therefore, there are significant similarities between the type of silicone and curing temperature of the invention of Applicant and Lee et al.

Miyajima et al. in view of Lee et al. fail to teach the claimed time interval.

The prior art invention, as shown above, involves the same method for manufacturing a semiconductor device and same silicone viscosity as that of the prior art invention. Thus, the prior art invention would be reasonably expected to have the same properties as those of the claimed invention. In particular, the prior art invention would necessarily have a “time interval from the moment directly after measurement of a torque with a curometer at the molding temperature to the moment when the torque reached 1 kgf\*cm is not less than 1 min., while the time interval during which the torque grows from 1 kgf\*cm to 5 kgf\*cm is not more than 1 min”.

- b. Regarding claims 2-3, Miyajima et al. in view of Lee et al. teach that the silicone composition is a hydrosilylation-curable liquid silicone composition (Lee et al. paragraphs 57-58) and that the cured silicone has a modulus of elasticity of 1 GPa or less (Lee et al. table 1);
- c. Regarding claim 4, Miyajima et al. teach clamping the semiconductor device between the upper mold and the lower mold, and compression molding the adopted resin (figure 2).
- d. Regarding claim 5, Miyajima et al. teach that the obtained sealed assembly is cut into separate sealed semiconductor devices (figure 5).
- e. Regarding claim 6, Miyajima et al. teach that the semiconductor device comprises chips 10 on a printed circuit board 12 (substrate) ([0045] and figure 1) and where the chips are electrically connected via bonding wires ([0088]).
- f. Regarding claim 7, Lee et al. teaches that the silicone composition exhibits rapid flow around and/or under a silicon chip ([0018]) and, as stated above, the chip 10 is placed on the printed circuit board 10 and the chips are electrically connected via bonding wires. Thus, the silicone would be applied onto the surface that supports the semiconductor chips of the printed circuit board.
- g. Regarding claims 8-9, Miyajima et al. teach the use of release films (paragraph 50) held against the inner surface of the mold by air suction (paragraph 12).

***Response to Arguments***

4. Applicant's arguments have been fully considered but they are not persuasive.

The Applicant continues to traverse the rejection of claims 1-9 under 35 USC § 103(a) over Miyajima et al. in view of Lee et al. on the basis that the Examiner has failed to properly establish that every element of independent claims 1 is taught by the combination of Miyajima et al. in view of Lee et al. or that obviousness has not been established through optimization of a known result effective variable.

The Examiner has clarified the result effective variable rejection above.

As to the New Rejections of Claims 1-9 Under 35 U.S.C. §103(a) Over Miyajima et al. in View of Lee et al. That Rely Upon Principles of Obvious Optimization of a Known Result-Effective Variable

Applicant takes the position that Miyajima et al. in view of Lee et al. fail to teach a method wherein “a time interval from the moment directly after measurement of a torque of the curable liquid silicone composition at the molding temperature to the moment when the torque reached 1 kgf\*cm is not less than 1 min., while the time interval during which the torque grows from 1 kgf\*cm to 5 kgf\*cm is not more than 1 min.”

Applicant goes on to state that the instant case pertains to discovery of previously unidentified curing parameters of a curable liquid silicone composition that, when employed in a method of sealing a semiconductor device, produce unexpected results relative to sealing the semiconductor device. The Examiner disagrees.

Applicant points to Table 1 as a showing of these unexpected results and states “the combination of viscosity of the curable silicone composition, time to achieve a torque of 1 kgf\*cm during curing, and time to achieve a torque of 5 kgf\*cm during curing

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affect the formation of voids, fillability, and warping of the semiconductor..." Though Applicant makes these statements, there is no correlation or data in Table 1 of how the above mentioned properties affect the "formation of voids, fillability, and warping of the semiconductor." Therefore, Table 1 and the statements made by Applicant are not sufficient to show unexpected results.

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SAEED HUDA whose telephone number is (571)270-5514. The examiner can normally be reached on 8:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571.272.1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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Examiner, Art Unit 1742

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